

AMENDMENTS TO THE CLAIMS

Claims 1-12 (Cancelled)

Claim 13 (Currently Amended) A method of operating a communication system comprising (i) an Nth authentication apparatus, (ii) an (N+1)th authentication apparatus, and (iii) an (N+1)th download server, each being connected over a communication network,

wherein N and (N+1) are values each indicating a number in a sequence in a case where a plurality of authentication apparatuses and a plurality of corresponding download servers are sequentially put into operation, N being an integer of 1 or larger,

wherein the Nth authentication apparatus includes:

an Nth server certificate issue unit operable to issue an Nth server certificate ensuring validity of an application server; and

an Nth certificate authority (CA) information issue unit operable to issue Nth CA information including an Nth CA certificate and an (N+1)th address for update, the Nth CA certificate indicating that the Nth server certificate is valid, and the (N+1)th address for update indicating a location of the (N+1)th download server on the communication network,

wherein the (N+1)th authentication apparatus includes:

an (N+1)th server certificate issue unit operable to issue an (N+1)th server certificate ensuring the validity of the application server; and

an (N+1)th CA information issue unit operable to issue (N+1)th CA information including an (N+1)th CA certificate and an (N+2)th address for update, the (N+1)th CA certificate indicating that the (N+1)th server certificate is valid, the (N+2)th address for update indicating a location, on the communication network, of an (N+2)th download server on which

(N+2)th CA information is placed, and the (N+2)th CA information including an (N+2)th CA certificate to be a next valid CA certificate in a case where the (N+1)th CA certificate is revoked,

wherein the (N+1)th download server includes:

a CA information storage unit operable to store the (N+1)th CA information including the (N+1)th CA certificate to be a next valid CA certificate in a case where the Nth CA certificate is revoked; and

an output unit operable to output, to a communication apparatus, the (N+1)th CA information stored in the CA information storage unit, the communication apparatus being connected to the (N+1)th download server via the communication network, the communication apparatus being a client apparatus that receives a service from the application server after the validity of the application server is verified, and

wherein said method comprises:

an Nth operation step of starting up the Nth authentication apparatus to place the Nth authentication apparatus in operation to issue the Nth server certificate;

a first revocation determination step of determining whether or not the Nth CA certificate has been revoked before a validity period of the Nth CA certificate expires;

a before-validity-period-expiration determination step of determining whether or not a certain point in time before the validity period of the Nth CA certificate expires has arrived, when said first revocation determination step determines that the Nth CA certificate has not been revoked;

~~issuing, via the Nth CA information issue unit of the Nth authentication apparatus, the Nth CA information including (i) the Nth CA certificate indicating that the Nth server certificate is valid and (ii) the (N+1)th address for update indicating the location of the (N+1)th~~

~~download server on the communication network;~~

~~an (N+1)th operation step of after said starting up of the operation of the Nth authentication apparatus; starting up the (N+1)th authentication apparatus and the (N+1)th download server to place the (N+1)th authentication apparatus and the (N+1)th download server into operation, when said before-validity-period-expiration determination step determines that the certain point in time before the validity period of the Nth CA certificate expires has arrived such that the (N+1)th download server outputs the (N+1)th CA information stored in the CA information storage unit to the communication apparatus that is the client apparatus that receives the service from the application server after the validity of the application server is verified, said starting up of the (N+1)th authentication apparatus and the (N+1)th download server taking place before a validity period of the Nth CA certificate expires; and;~~

~~_____ a second revocation determination step of redetermining whether or not the Nth CA certificate has been revoked before the validity period of the Nth CA certificate expires;~~

~~_____ a validity-period-expiration determination step of determining whether or not the validity period of the Nth CA certificate has expired, when said second revocation determination step determines that the Nth CA certificate has not been revoked; and~~

~~a termination step of terminating the operation of the Nth authentication apparatus when said validity-period-expiration determination step determines that the validity period of the Nth CA certificate has expired the (N+1)th download server after the validity period of the Nth CA certificate expires.~~

Claim 14 (Currently Amended) The method according to Claim 13,

wherein, ~~in said starting up of the (N+1)th operation step~~ further includes, when the Nth

~~CA certificate is revoked before the validity period of the Nth CA certificate expires, starting up authentication apparatus and the (N+1)th download server, the (N+1)th authentication apparatus and the (N+1)th download server to be put into are put in operation when the Nth CA certificate is revoked.~~

Claim 15 (Cancelled)